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Observatory, and the one now actually in operation, includes: (1) the photometric work with the 12-inch and 5-inch equatorials; (2) the determination of fundamental Right Ascensions with the new 9-inch photographic transit instrument; (3) the study of the variations of the polar axis, with the 6-inch photographic zenith telescope; (4) the determination of the positions of double stars and *Jupiter's* satellites, according to the photochronographic method, with the 12-inch equatorial. As an earnest of the faithfulness with which this programme is being carried out, it may be mentioned that the material for 9 new volumes is in preparation for publication.

THE STORM OF JANUARY 15, 1895, AT MOUNT HAMILTON.

BY C. D. PERRINE.

The storm which began on January 15th and lasted until the 23d was one of the severest in the history of the Observatory. In point of duration and intensity combined, it exceeded any previous ones, and the snowfall was about equal to the heavy one of February, 1890. The barometric pressure was the lowest on record, with but one exception—namely, that of February 23, 1891.

The barographic record of the recent storm is unusually interesting. The first indications of the approach of a storm were to be noticed on the night of January 10th, when the pressure, though still above normal, became unsteady. This unsteadiness increased during the next sixty hours, the pressure all this time remaining above the normal. At 2 P. M., on January 13th, the mercury began falling slowly but steadily, until 10:45 A. M., on the 15th, when it had reached 25.370 inches, a point at which very heavy storms are usually experienced. Here it began to fall with unusual rapidity until 10:30 P. M., when a series of very rapid and sharp variations set in, which culminated at 1:45 A. M., on the 16th, at 25.060 inches. The pressure fluctuated within about 0.10 inch of this point for a full day, and then rose slightly, and for the next three days ranged about

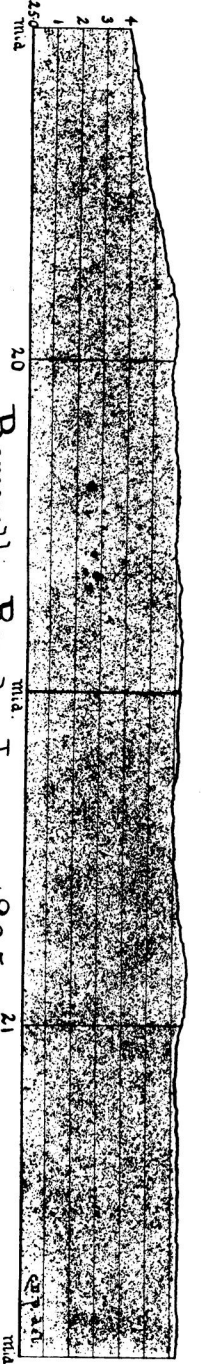
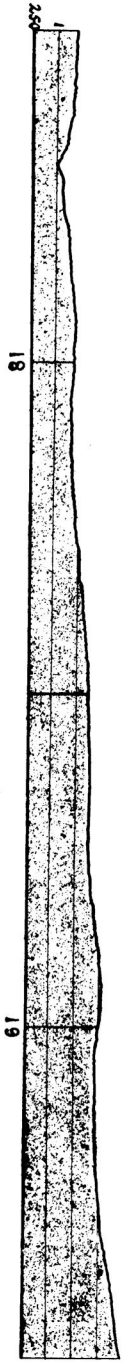
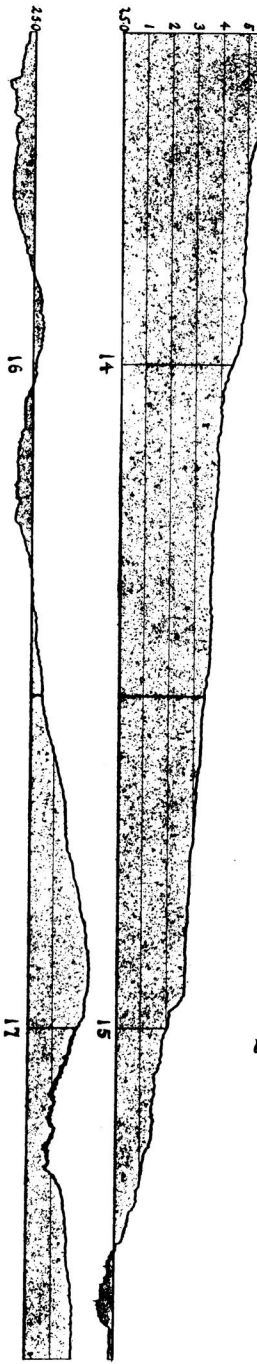
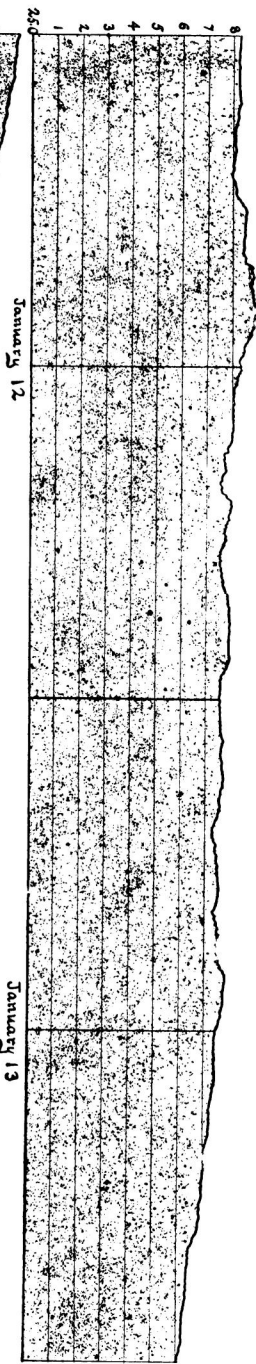
25.300 inches. From this, the pressure gradually recovered to the normal on the 23d.

The accompanying diagram shows the variations of pressure for the ten days beginning with January 12th, at midnight, as recorded by the Draper self-recording barometer of the LICK Observatory. The irregular heavy line at the top of the shading indicates the barometric pressure; the base line representing 25.00 inches, and each space $\frac{1}{16}$ inch. A systematic difference exists between this instrument and a standard mercurial barometer, the readings referred to above being from the latter. The wind was from the usual direction for the winter storms here, *i. e.*, south and southeast, and had been for some time previous. On the afternoon of the 22d the wind shifted to the north, and on the night of the 23d cleared off, after an interval of thirteen cloudy days. The wind velocity was greatest about 10 P. M. on the 15th. In attempting to read the dial, about 9:45, the anemometer was broken, so that the actual velocity is not known. From 5:04 P. M. until it was broken, about 9:45, there had been a total movement of 266.7 miles, or an average of over 57 miles per hour. At the time of the earlier reading, the velocity was not over 40 to 45 miles, and, as it did not increase much until about 8 P. M., the maximum velocity was, most probably, between 80 and 90 miles. The lowest temperature of the storm was but 5° below freezing, and usually ranged between 30° and 32° F.

As stated, the lowest barometer on record occurred on February 23, 1891, when, from 5 P. M. to 9:30 P. M., it fluctuated about 24.964 inches, but was below the normal for only $3\frac{1}{2}$ days; while in the recent storm it remained below the normal for 9 days, and for $5\frac{1}{2}$ days was below the point where the most of our heavy storms occur.

Snow began falling on the night of the 15th, and continued until the morning of the 20th, when there was an average of 4 feet or over on the ground, but drifted very heavily. Around the Observatory the drifts were 6 to 8 feet deep, and much deeper in other places.

On account of snow, the stages could not reach the Observatory between January 15th and February 1st. The drifts were still very deep near the summit, and would have been impassable for several weeks longer had they not been plowed open. The mails and small parcels of provisions were brought as far as



Barographic Record, January 1895.

possible by the stages, which, for the first few days of the storm, was little more than half-way from Smith Creek. The remainder of the distance was made on horseback and on foot. For over a week the last half-mile had to be gone afoot.

The weight of snow and ice broke the telegraph and telephone wires frequently, but, as much of this damage occurred near the summit, it was repaired by those who went to meet the stages, and, by this means, the telephone was kept working for a portion, at least, of almost every day. The only other damage of any consequence was the breaking of some glass in the skylight over the main hall of the Observatory, and the breaking of some of the electric wires between buildings.

LICK OBSERVATORY, February 5, 1895.

LIST OF EARTHQUAKES IN CALIFORNIA FOR THE
YEAR 1894.

COMPILED BY C. D. PERRINE.

The following list gives the dates and places of occurrence of earthquakes in California (including, also, a number outside of the State), compiled from observations at Mount Hamilton and reports received at the LICK Observatory, both by letter and newspaper. A number of disturbances have come under our notice which are not properly within our province, but which may possibly have escaped other compilers, and are, therefore, included.

The accounts of shocks in Nevada are, principally, from the Annual Report of the Nevada State Weather Service (Professor C. W. FRIEND, Director) for 1894.

This is a continuation of similar reports printed in Vol. II, p. 74; Vol. III, p. 247; Vol. V, p. 127, and Vol. VI, p. 41, of these *Publications*. A more complete account will be published as a bulletin by the United States Geological Survey. The dates are civil dates. The times are Pacific Standard (120th Meridian).

Roman numerals enclosed in parentheses indicate the intensity on the ROSSI-FOREL scale. The reports of the Lighthouse Board and of the Weather Bureau should be consulted in this connection.